

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*

Mag-03

Three-Axis Magnetic Field Sensors

Innovation in Magnetic Field Measuring Instruments

Bartington® Instruments

Mag-03 Three-Axis Magnetic Field Sensors

These compact, high performance fluxgate sensors with integral electronics provide precision measurements of static and alternating magnetic fields in three axes. They are available in a variety of enclosures. Powered from any ±12V supply, outputs are in the form of three analogue voltages from 0 to ±10V, proportional to Bx, By and Bz.

The sensors have a wide range of applications in physics, bioelectromagnetics, geophysical exploration and defence.

Bartington Instruments can supply a range of mounting accessories, and cables for connection to power supply and data acquisition units. Calibration check units are available for the complete range of sensors, as is a full calibration service.





Features

- Wide choice of enclosure types: square section, cylindrical, titanium shielded, unpackaged, two part, independent elements.
- Three noise levels available:
  - Low noise 'L': <6pTrms/√Hz at 1Hz
  - Standard: 6 to ≤10pTrms/√Hz at 1Hz
  - Basic: >10 to 20pTrms/√Hz at 1Hz
- Measuring ranges from ±70μT to ±1000μT.
- Bandwidth typically 3kHz (5kHz for Mag-03IEv1&2 on request).

Typical Applications

- Measurement of disturbances in the geomagnetic field.
- Use as feedback sensors in active magnetic field shielding systems.
- Measurement of the effectiveness of passive shielding.
- Orientation sensing.

Product Identification

Product name	Package	Noise*	Range in µT
Mag-03	MC= Cylindrical MCES = Cylindrical, environmentally sealed to IP64 MCFL = Cylindrical, connections via flying leads MCT = Cylindrical, titanium shielded MCUP = Cylindrical, unpackaged MCTP = Cylindrical, two-part construction MS = Square section MSES = Square section, environmentally sealed to IP64 MSS = Square section, submersible IE = Independent elements IEHV = Independent elements, for use in a high vacuum chamber	B = Basic L = Low Standard = no letter	±70 ±100 ±250 ±500 ±1000

* If no noise level is specified then sensor is Standard noise.

Example: Mag-03MC100 is a standard low noise sensor in a cylindrical enclosure with a range of ±100µT.

Note: For some Mag-03 magnetometers (MCFL, MCTP, MCUP, IE), lead lengths must be specified. This length is included in the product identification. For example, Mag-03MCFL250-1000 is a Mag-03MCFL with a range of 250µT and flying leads of 1000mm.

Mag-03 Specifications

Performance	
Number of axes	Three
Polarity	+ve non-inverting output when pointing North
Bandwidth at -3dB	3kHz (5kHz for Mag-03IEv1&2 on request)
Measurement noise floor: basic version standard version low noise version	 >10 to 20pTrms/√Hz at 1Hz 6 to ≤10pTrms/√Hz at 1Hz <6pTrms/√Hz at 1Hz
Scaling error	<±0.5%
Orthogonality error	<0.5° (<0.1° for Mag-03MS and Mag-03MSES)
Alignment error (Z axis to reference face)	<0.1° (Mag-03MS and Mag-03MSES only)
Single sensor axis to body	<3.5° (Mag-03IE sensors only)
Linearity error	<0.0015%
Frequency response	0 to 1kHz maximally flat, ±5% maximum at 1kHz
Excitation breakthrough	<20mV pk-pk at 16kHz (3kHz bandwidth) <400mV pk-pk at 16kHz (5kHz bandwidth)

Scaling Dependent Parameters					
Measuring range (µT)*	**±70**	**±100**	**±250**	**±500**	**±1000**
Scaling (mV/µT)	143	100	40	20	10
Scaling temperature coefficient (ppm/°C)	±15	±20	±50	±100	±200
Offset error (nT)	±5	±5	±12	±25	±50
Offset temperature coefficient (nT/°C)	±0.1	±0.1	±0.2	±0.33	±0.6

* Low noise version has range of 70µT or 100µT only

Environmental and Mechanical

	Mag-03MC	Mag-03MCES
Operating temperature range: continuous intermittent	 -40°C to +70°C -40°C to +85°C	 -40°C to +70°C -40°C to +85°C
Environmental protection	IP51	IP64
Dimensions (ø x L)	25 x 202mm	25 x 207mm
Weight	85g	100g
Enclosure material	Reinforced epoxy	Reinforced epoxy
Connector	Hirose RM15TRD10P	Amphenol 62GB-51T10-7P
Mating connector	Hirose RM15TPD10S	Amphenol 62GB-16J10-7S
Mounting	Mounting bracket or tripod adapter available	Mounting bracket or tripod adapter available

	Mag-03MCFL	Mag-03MCT
Operating temperature range: continuous intermittent	 -40°C to +70°C -40°C to +85°C	 -40°C to +70°C -40°C to +85°C
Environmental protection	IP51	IP51
Dimensions (ø x L)	25 x 211mm	25 x 202mm
Weight	80g	95g
Enclosure material	Reinforced epoxy	Titanium
Connector	Flying leads 500mm length[2,3] (Up to 5000mm length to order)	Hirose RM15TRD10P
Mating connector		Hirose RM15TPD10S
Mounting	Mounting bracket or tripod adapter available	Mounting bracket or tripod adapter available

	Mag-03MCTP	Mag-03MCUP
Operating temperature range: continuous intermittent	 -40°C to +70°C -40°C to +85°C	 -40°C to +70°C -40°C to +85°C
Environmental protection	IP51	Unpackaged conformal coating
Dimensions (mm)	Electronics: ø25 x 115 length Sensor: ø20 x 54 length Sensor-electronics cable: 1000 length[3] (up to 5000 length to order)	Electronics (WHL): 21 x 12 x 80 Sensor: ø20.9 x 56 length Sensor-electronics cable: 610 length[3] (up to 5000 length to order)
Weight	80g	80g
Enclosure material	Sensor: reinforced epoxy Electronics: aluminium alloy	Sensor: reinforced epoxy Electronics: conformal coating
Connector	Hirose RM15TRD10P	Flying leads 500mm length[2,3] (up to 5000mm length to order)
Mating connector	Hirose RM15TPD10S	
Mounting	Mounting bracket or tripod adapter available[1]	

	Mag-03MS	Mag-03MSES
Operating temperature range	-40°C to +70°C	-40°C to +70°C
Environmental protection	IP51	IP64
Dimensions (W x H x L) (mm)	32 x 32 x 152	32 x 32 x 166
Weight	160g	160g
Enclosure material	Reinforced epoxy	Reinforced epoxy
Connector	ITT Cannon DEM-9P-NMB	Amphenol 62GB-12E10-7P
Mating connector	ITT Cannon DEM-9S-NMB	Amphenol 62GB-16J10-7S[4]
Mounting	2 x M5 fixing holes. Tripod adapter available	2 x M5 fixing holes. Tripod adapter available

	Mag-03IE	Mag-03IEHV
Operating temperature range: continuous intermittent	 -40°C to +70°C -40°C to +85°C	 -40°C to +70°C -40°C to +85°C
Environmental protection	IP51	For use in high vacuum chambers
Dimensions (mm)	Electronics: ø25 x 115 length Sensor: ø8 x 30 length Sensor-electronics cable: 750[2,3] length (up to 5000 length to order)	Electronics: ø25 x 115 length Sensor: ø6.5 x 30 length Inner cable: 1100[2,3] length (up to 5000 length to order) Outer cable: 140 length Inner and outer cable joined by re-solderable terminal block
Weight	80g	80g
Enclosure material	Sensors: alumina cylinder Electronics: aluminium alloy	Sensors: glass tube with epoxy filling Electronics: aluminium alloy
Connector	Hirose RM15TRD10P	Hirose RM15TRD10P
Mating connector	Hirose RM15TPD10S	Hirose RM15TPD10S
Mounting	Mounting bracket or tripod adapter available[1]	Mounting bracket or tripod adapter available[1]

	Mag-03IEv1	Mag-03IEv2
Operating temperature range: continuous intermittent	 -40°C to +70°C -40°C to +85°C	 -40°C to +70°C -40°C to +85°C
Environmental protection	IP51	IP51
Dimensions (mm)	Electronics: ø25 x 105 length Sensor: ø8 x 30 length Sensor-electronics cable: 750 length[2,3] (up to 5000 length to order)	Electronics: ø25 x 105 length Sensor: ø8 x 30 length Sensor-electronics cable: 750 length[2,3] (up to 5000 length to order)
Weight	80g	80g
Enclosure material	Sensors: alumina cylinder Electronics: aluminium alloy	Sensors: alumina cylinder Electronics: aluminium alloy
Connector	9-way 'D' type on a 5m cable	25-way 'D' type on a 5m cable
Mating connector	9-way 'D' type	25-way 'D' type
Mounting	Mounting bracket or tripod adapter available[1]	Mounting bracket or tripod adapter available[1]

	Mag-03MSS
Operating temperature range	-10°C to +50°C
Environmental protection	IP68 (submersible to 2000m)
Dimensions (mm)	30 x 30 x 208
Weight	185g
Enclosure material	Polyacetal
Connector	Impulse IE XSJ-7-BCR
Mating connector	Impulse IE XSJ-7-CCP[4]
Mounting	3 x M3 clearance holes

See the Mag-03 product page at www.bartington.com/mag-03 for sensor outline drawings of these enclosure types.

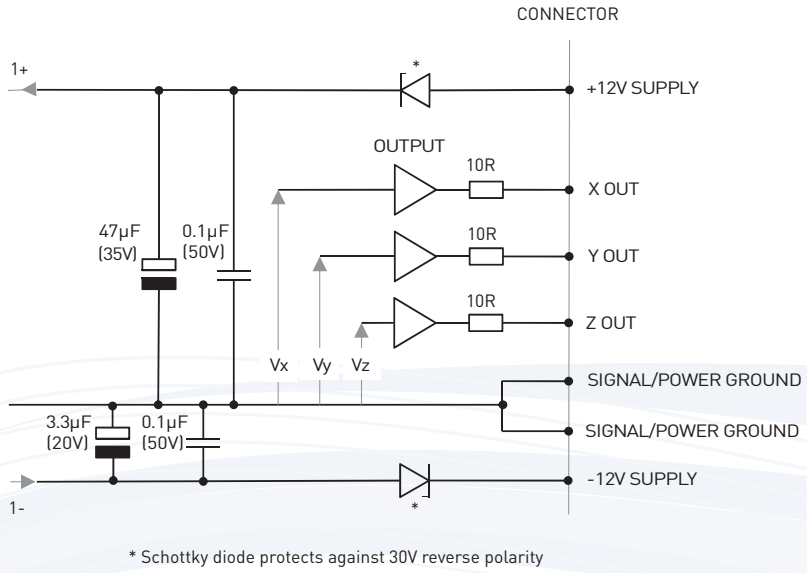
Footnotes to sensor specifications

1. Bracket or Tripod Adaptor is only suitable for the electronics enclosure.
2. Flying leads and independent elements wires are susceptible to EM interference and should be screened wherever possible.
3. Standard length if not specified in order.
4. Modified to be non-magnetic.

Electrical	
Supply voltage	±12V to ±17V
Current consumption	+30mA, -10mA (+1.4mA per 100µT for each axis)
Power supply rejection ratio	5µV/V (-106dB)
Analogue output	±10V (±12V supply) swings to within 0.5V of supply voltage (unbalanced, single ended ref. 0V)*
Output impedance	10 Ω

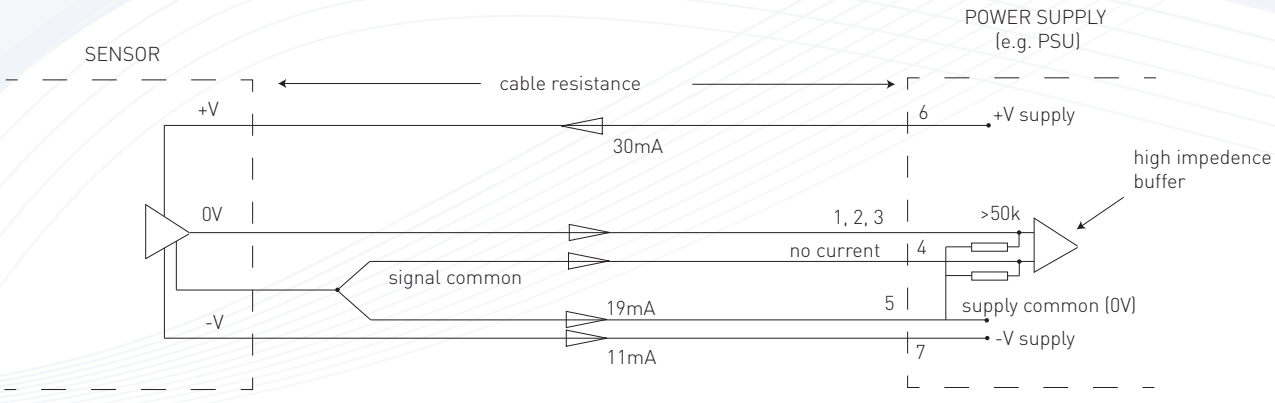
* In the temperature range -40˚C to +70˚C, and with an external load of 10kΩ, the maximum output voltage will be less than the supply voltage by the value given in the table below. All parameters, other than the output voltage range, remain unaffected for supply voltage (V_s) changes in the range from ±8 to ±15V.

Nominal range (µT)	100	250	500	1000
Output swing	V_s - 0.5	V_s - 0.7	V_s - 0.8	V_s - 1.0



* Schottky diode protects against 30V reverse polarity

Mag-03 interface schematic



Mag-03 electrical schematic

Mating Connectors

With the exception of the Mag-03MSS, non-magnetic mating connectors are provided free of charge for all Mag-03 sensors purchased without cables.

Cables

The standard cable length is 5m. Other lengths up to 600m can be supplied on request. All cables terminate with a Hirose RM15TPD10S, suitable for connection to Bartington Instruments' range of data acquisition and power supply units.

Mag-03MS, Mag-03MSES, Mag-03IE, Mag-03MC, Mag-03MCES, Mag-03MCT, Mag-03MCTP	
Conductors	7/0.2 PVC insulated conductors, overall braided screen and PVC sheath
Type no.	7-2-8C Black to Def Stan 61-12, part 4
Conductor resistance	0.092Ω/m
Capacitance	100pF/m core to core 170pF/m core to screen

Mag-03MSS submersible cable	
Conductors	3 pairs individually screened, with polyurethane sheath
Conductor resistance	0.034Ω/m
Weight	0.10kg/m (in air) / 0.026kg/m (in sea water)
Cable bending radius	77mm

Cable connections

SIGNAL	SUPPLY END	SENSOR END					
		Mag-03MS	Mag-03MC Mag-03IE Mag-03IEHV Mag-03MCTP Mag-03MCT	Mag-03MCES Mag-03MSES	Mag-03MSS	Mag-03IEv1	Mag-03IEv2
X out	1	6	1	A	1	1	5
Y out	2	8	2	B	2	2	6
Z out	3	5	3	C	3	3	7
Signal/Power ground	4	4	4	D	4	6,7,8	17,18,19
Signal/Power ground	5	3	5	E	5	9	12
+12V supply	6	1	6	F	6	4	11
-12V supply	7	2	7	G	7	5	13
NC	8,9,10	7,9	8,9,10		8,9,10		1,2,3,4,8,9, 10,14,15

For details of cable colours see the figure showing the relevant cable on the Bartington Instruments website.

Compatibility

The Mag-03 range is compatible with the following data acquisition and power supply units from Bartington Instruments:

- PSU1 Power Supply Unit
- Magmeter and Magmeter-2 Power Supply and Display Units
- Spectramag-6 Data Acquisition Unit
- SCU1 Signal Conditioning Unit
- Mag-03DAM Data Acquisition Module
- Decaport Analogue Interface Module
- DAS1 Data Acquisition System
- DecaPSU Power Supply Unit

Mounting Accessories

A range of non-magnetic mounting accessories are available:

Specification	
Mag-BR	Mounting bracket for use with the cylindrical range of Mag-03 sensors[1]
Mag-T	Tripod
Mag-TA	Adaptor to connect sensor to Mag-T tripod (not compatible with Mag-03MSS)[2]
Mag-LP	Levelling platform; can be mounted on the Mag-T tripod or Mag-MR rack; compatible with Mag-TA
Mag-MR	Mounting rack for the installation of Mag-LP platforms; available in lengths of 1 metre and multiples

1. The bracket is manufactured from reinforced epoxy resin and supplied complete with nylon mounting screws.
2. The Mag-03MSS has a square section pressure housing with three mounting holes, 4 mm in diameter, drilled through the body and counterbored for cheesehead screws.

Sensor	Appropriate support	Notes
Mag-03MC Mag-03MCES Mag-03MCT Mag-03MCFL	Mag-BR mounting bracket. Mag-TA tripod adaptor	Bracket clamps around the cylindrical enclosure.
Mag-03IE	Mag-BR mounting bracket. Mag-TA tripod adaptor	Bracket clamps around the body of the sensor, not the sensor heads.
Mag-03MS Mag-03MSES	Mag-TA tripod adaptor	Sensors have threaded holes tapped in the base which is also the datum face. The sensors can be mounted on any flat, non-magnetic surface, including the top of the mounting bracket, using the two brass screws supplied. A thin gasket or a suitable sealant should be used to seal the base of the units against water penetration.
Models not listed	Customer must provide mounting support	

Calibration Units

These units provide a fast and convenient facility to test the accuracy and functionality of a Mag-03 sensor. They consist of a battery powered Helmholtz coil generating an alternating magnetic field, with guides to align each of the sensor axes in turn.

Note that these units are not intended as a full calibration facility. It is recommended that sensors are returned to Bartington Instruments for full recalibration.



Specification	
Sinewave magnitude	50µT p-p (17.5µT rms) ±1% (distortion 5% typical)
Frequency	190Hz ±2%
Environmental	IP60 not suitable for use in wet conditions
Dimensions (mm)	ø100 x 125 length
Weight	990g
Enclosure material	Polyethylene terephthalate
Battery	PP3 9V alkaline or lithium dioxide (20 hours' continuous use) with tri-colour LED indicator

Ordering code:	Suitable for use with:
Mag-03MS-CU	Mag-03MS, Mag-03MSES
Mag-03MSS-CU	Mag-03MSS
Mag-03MC-CU	Mag-03MC, Mag-03MCES, Mag-03MCFL, Mag-03MCT, Mag-03MCUP, Mag-03MCTP
Mag-03IE-CU	Mag-03IE

DS0013/25

Bartington®
Instruments

Bartington Instruments Limited,
5, 10 & 11 Thorney Leys Business Park,
Witney, Oxford, OX28 4GE, England.

T: +44 (0)1993 706565
F: +44 (0)1993 774813
E: sales@bartington.com

The specifications of the products described in this brochure are subject to change without prior notice.
Bartington® is a registered trademark of Bartington Instruments Ltd.

www.bartington.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP